

特种计算机

Industrial Computer

产品说明书

User Manual

ERC-1005

轨道交通 AFC 系统终端

AFC Terminal for Metro

Version: C01

Legal Information

Warnings

Please pay attention to the tips within the manual so as to avoid personal injury or property losses. The tips for personal injury are indicated in warning triangles while the tips only related to property losses have no warning triangles. The warning tips are listed as follows with the hazardous scale from severe to slight.

⚠ **Danger**
If handled carelessly, death or severe human injury will occur.

⚠ **Warning**
If handled carelessly, death or severe human injury might occur.

⚠ **Caution**
Warning triangle indicates that slight human injury might occur if handled carelessly.

Note
Unexpected result or status might occur, if not handled according to the tips.

Professional Personnel

The product/system covered by the manual can only be handled by qualified and professional personnel. During operation, please follow the respective instructive manuals, especially the safety warnings. The professional personnel have been trained and possess relevant experiences; therefore, he/she could be aware of the risks of the product/system and avoid possible damages.

EVOC Product

Please pay attention to the following instructions:

⚠ **Warning**
EVOC product can only be used according to the descriptions within the manual, including the contents and the relevant technical documents. If the products or components from other companies are required, please get the recommendation and grant from EVOC first. Proper transportation, storage, assembly, installation, debugging, operation and maintenance are prerequisite to ensure product safety and normal operation; therefore, please ensure permitted environment conditions and pay attention to the tips within the manual.

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Warranty Terms:

The warranty on the product lasts for one year. If the user has additional requirements, the contract signed between the two sides shall prevail.

Please visit our website: http://www.evoc.com for more information,
or send an email to the Technical Support Mailbox support@evoc.com (International) or support@evoc.cn (Domestic) for consultation.

Hotline: 4008809666

About this manual

Scope of the Manual

The manual is appropriate for EVOC ERC-1005.

Convention

The term “the Board” or “the Product” within the manual stands for EVOC ERC-1005.

Instructions

Safety instructions

To avoid property losses or individual injury, please pay attention to the safety instructions within the manual. The warnings within the manual are marked with warning triangle ⚠, which is dependent upon the scale of the potential hazard.

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1. Product Introduction

1.1 Overview

ERC-1005 is a low-power fanless embedded PC, which contains Intel® Atom™ low power consumption CPU and supports WinXP, Linux, WinCE and Vxworks operating system.

The PC adopts al-alloy material, small form factor, modular board + backplane design scheme, simple structure and various I/O and expansion connectors; the modules are interconnected by European pin headers to ensure highly reliable operation environment and features excellent dust-proof, heat dissipation and anti-vibration performances.

ERC-1005 is the main control unit of the AFC system for metro, which is used as the main control unit of the AGM, TVM and BOM in AFC system. The PC complies with GB 9254-2008 and GB/T 17626-2008 standards.

1.2 Product Specifications

Items		Definitions
Main Functional Index	Microprocessor	Intel® Atom™ Processor N455/D525 CPU on-board
	Chipset	Intel® ICH8M
	Memory	DDR3 (800MHz) memory 2GB on-board
	Display Function	Supports dual VGA+LVDS display; the maximum resolution supported by VGA1 is 2048x1536@60Hz, those supported by VGA2 and LVDS are 1280x800
	LAN Function	Two 10/100/1000Mbps LAN ports; LAN1 supports Wake-on-LAN function

	Audio Function	Adopts HD standard, supporting MIC-IN/LINE-OUT
	Expansion Bus	Expandable to one standard PC/104 card
	External IO Connectors	● Ten serial ports: COM3 ~ COM5 are isolation serial ports; COM2, COM9 and COM10 support to switch among RS-232/RS-422/RS-485; while COM9 supports Modem wake-up function; ● Two 10/100/1000Mbps LAN ports; ● Two VGA display connectors; ● One LVDS connector (only supports 18bit, DVI-I connector bring-out); ● Six USB2.0 ports, two on the front panel while the other four on the rear panel; ● One PS/2 keyboard/mouse connector; ● One AUDIO connection (vertical socket, one MIC-IN and one LINE-OUT); ● Two 16-chanenl GPIO connectors: GPIO1 is digital GPIO while GPIO2 is isolation GPIO; ● One CF card slot (optional with CF card); ● One LPT connector;
Main Performance Index	**Dimensions (excluding the hangers)**	245mm(W) x 117.8mm(H) x 196mm(D)
	Weight	5.35Kg
	Temperature	Operating Temperature: Equipped with CF card and DOM PC： -20°C ~ 65°C; Equipped with mechanical hard disk PC：0℃～40℃； Storage Temperature: -40°C ~ 75°C;
	Humidity	5%～90% 40℃ (non-condensing)

	EMC	● GB 9254-2008 Radiation disturbance, class A; ● GB 9254-2008 Conducted susceptibility, class A; ● GB/T 17626.2.2006 Electrostatic discharge, level 2; ● GB/T 17626.4-2006 Burst Immunity, level 2; ● GB/T 17626.5-2008 Surge (Impact) immunity, level 2; ● GB/T 17626.6-2008 Conducted susceptibility, level 2; ● GB/T 17626.8-2006 Power frequency magnetic field, level 2; ● GB/T 17626.11-2008 Voltage dips and short supply interruption.
	Reliability	● MTBF≥50000h ● MTTR≤20 min.
	Safety	Meets the basic requirements of GB4943-2001;
	Mechanical and Environment Adaptability	● Anti-vibration: 5-17Hz/1.0mm amplitude; 17-200Hz/1.0g acceleration; ● Anti-shock: 10g acceleration, 11ms duration;
	Power Feature	● Input Voltage/Current: DC12V ~ DC24V/max. 5A; ● Typical Power Consumption: 12V@26W ● Maximum power consumption: 12V@34W (MaxPower 100%)

2. Application Scheme

2.1 Transportation

Well-packaged products are suited for transportation by all kinds of vehicles. During transportation, products should not be put in open cabin or carriage. During transshipping, products should not be stored in open air without protection from the atmospheric conditions. Products should not be transported together with inflammable, explosive and corrosive substances and are not allowed to be exposed to rain, snow and liquid substances and mechanical force.

2.2 Storage

Products should be stored in package box when it is not used. And warehouse temperature should be 0°C ~ 40°C, and relative humidity should be 20% ~ 85%. In the warehouse, there should be no harmful gas, inflammable, explosive products, and corrosive chemical products, and strong mechanical vibration, shock and strong magnetic field interference. The package box should be at least 10cm above ground, and 50cm away from wall, thermal source, window and air inlet.

Caution
Risk of destroying the device! **When shipping the PC in cold weather, please pay attention to the extreme temperature variation. Under this circumstance, please make sure no water drop (condensation) is formed on the surface or interior of the device. If condensation is formed on the device, please wait for over twelve hours before connecting the device.**

2.3 Opening the Box and Initial Examination

Opening the Box

Please pay attention to the following issues when opening the box:

- Do not discard the original packing material. Please keep the original packing material for re-transportation.
- Please keep the documentation at a safe place. The documentation is required for initial device debugging, which is a component of the device.
- When doing the initial examination, please check whether there are distinct damages to the device caused during the transport.
- Please check whether the delivery contains the intact device and all of the independently ordered accessories. Please contact the customer service when any unconformity or transportation damages occur.

2.4 Mounting Mode

□19″ Rack Mount ■Desktop □Embedded Panel

■Wall Mount □VESA Standard Arm □Portable

□Others_____

3. Device Connection

3.1 Notices before Connection

⚠ **Warning**
Peripherals with reverse polarity must not be connected or built-in.

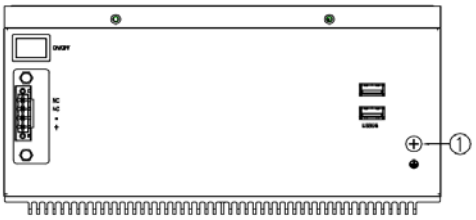
⚠ **Warning**
The device only operates when connected with grounded power. No operation is allowed when the device power is ungrounded or only impedance is grounded.

⚠ **Warning**
Rated voltage of the device in use shall be in accord with power feature of the product.

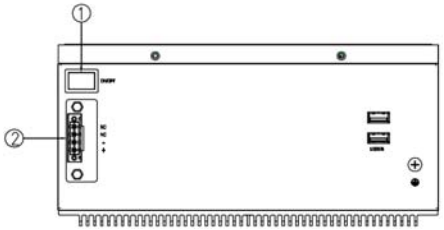
Note:
Only the peripheral devices approved for industrial application can be used. When operating the PC, hot swappable IO modules (USB) can be used. The IO devices without hot swap function can only be connected when the PC is powered off.

3.2 Product Grounding

Low impedance ground connection is more helpful to release the interference produced by the external cables, the signal cables or the cables connecting the IO module to the grounding system.

Ground Terminals	
The grounding terminal ① on the device (large surface or large area contact) shall be connected with the cabinet installed with the PC or the central grounding busbar on the device. The minimum cross section area of the cable shall be no less than 5mm^2.	

3.3 Connecting the Device to Power

Steps to connect the device to power:	
Please make sure the positive end and the negative end of the power cord are connected correctly when connecting the power cord ①. Please refer to the pin definitions of the power connector for detailed information.	
Connect the power cord with the connector ② and press down the switch ① with the silkscreen of "-". The green power LED indicator on the rear panel of the PC is lit and the PC is powered on.	

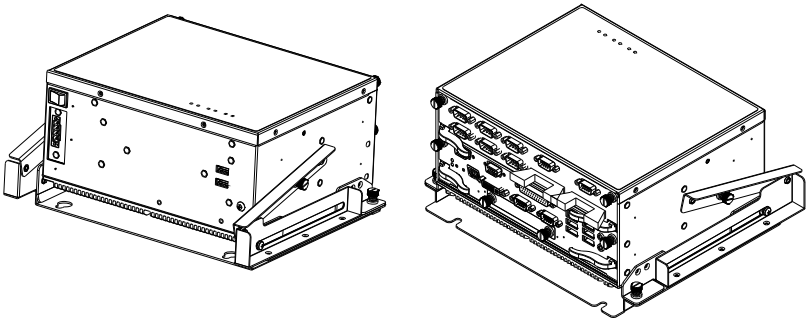
⚠ **Danger**
Please disconnect the power and data cables during thunder storm.

Note:
To completely isolate the device from the power supply, please disconnect the power connector.

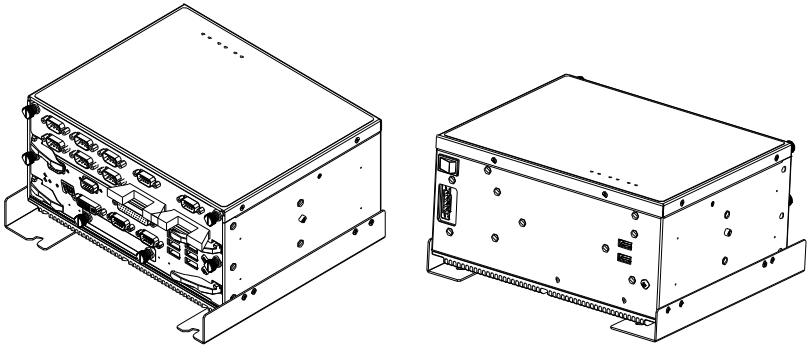
4. Instructions

4.1 Product Outline

4.1.1 PC with Movable Scaffolding

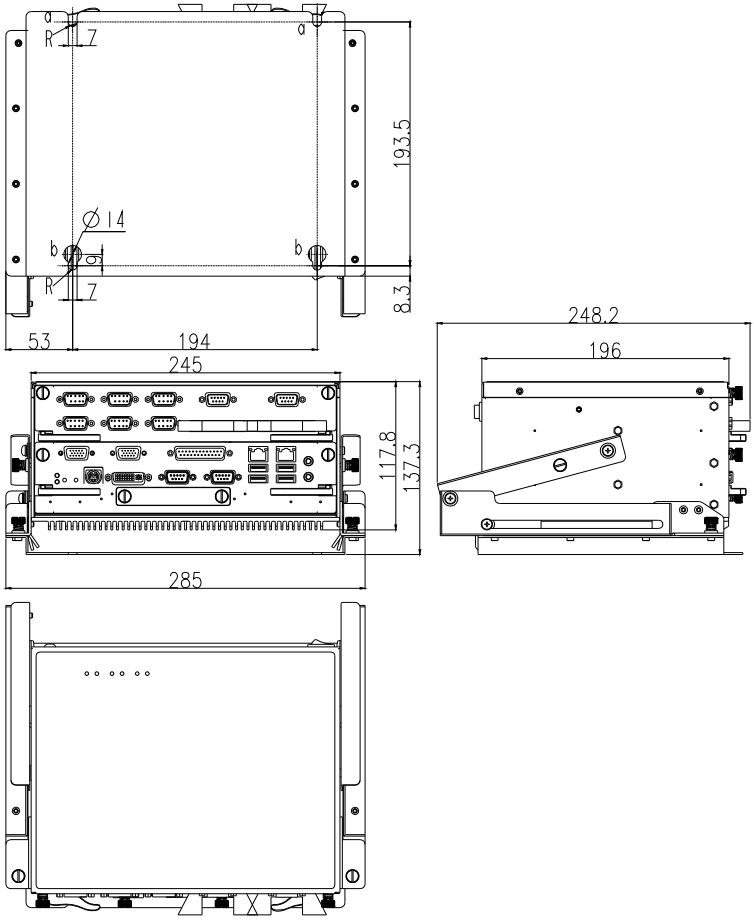


4.1.2 PC with Fixation Apparatus



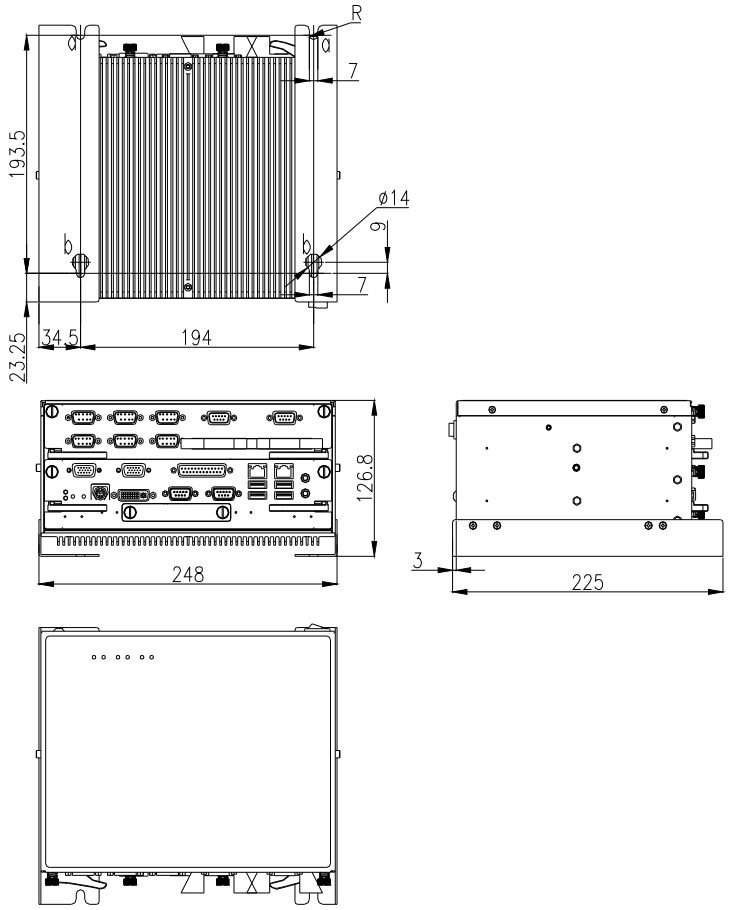
4.2 Product Appearance and Installation Dimensions

4.2.1 PC with Movable Scaffolding



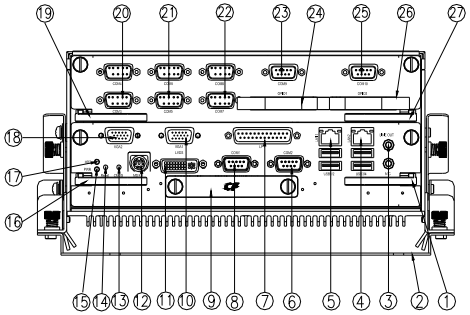
Unit: mm

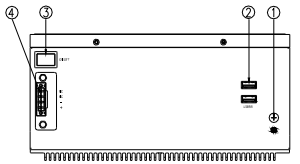
4.2.2 PC with Fixation Apparatus



Unit: mm

4.3 External Structure

Front View of the Device	Item	Description
	①	Assisting Handle
	②	Movable bracket
	③	LINE OUT/MIC
	④	LAN2/USB3/USB4
	⑤	LAN1/USB1/USB2
	⑥	COM2
	⑦	LPT
	⑧	COM1
	⑨	CF card cover
	⑩	VGA1
	⑪	LVDS
	⑫	MS/KB
	⑬	Clearing CMOS switch
	⑭	RESET switch
	⑮	PWR indicator
	⑯	Assisting Handle
	⑰	HDD indicator
	⑱	VGA2
	⑲	Assisting Handle
	⑳	COM3/COM4
	㉑	COM5/COM6
	㉒	COM7/COM8
	㉓	COM9
	㉔	GPIO1
	㉕	COM10
	㉖	GPIO2
	㉗	Assisting Handle

Rear View of the Device	Item	Description
	⑤	GND screw
	⑥	USB5/USB6
	⑦	Power switch
	⑧	Power input terminal

4.4 Pin Definitions

4.4.1 Power Connector



Pin	Signal Name
1	+
2	-
3	NC
4	NC

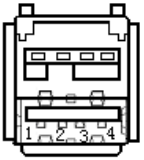
4.4.2 Audio Connector



AUDIO

Pin	Signal Name
1	LINE_OUT
2	MIC_IN

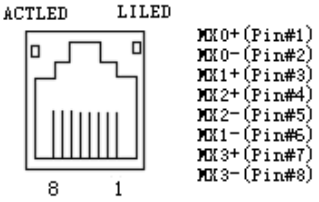
4.4.3 USB Port (USB1 ~ USB6 are standard USB ports)



USB1-2
USB3-4
USB5-6

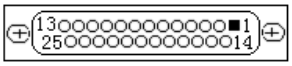
Pin	Signal Name
1	+5V
2	USB_Data-
3	USB_Data+
4	GND

4.4.4 LAN Port (LAN1 and LAN2 are standard connectors)



ACTLED (Green)	LAN Activity Status Indicator		LILED (Dual-Color: O/G)	LAN Speed Indicator
			Green	1000Mbps
Blink	Data being transmitted		Orange	100Mbps
Off	No data being transmitted		Off	10Mbps

4.4.5 Parallel Port (Adopts standard LPT connector)

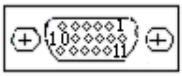


LPT

Pin	Signal Name	Pin	Signal Name
1	STB#	14	AFD#
2	PD0	15	ERR#
3	PD1	16	INIT#
4	PD2	17	SLIN#
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT		

4.4.6 Display Connector

1. Two VGAs, adopting standard DB15 connectors



VGA1/VGA2

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	NC	12	DDCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

2. One single-channel 18bit LVDS connector, adopting standard DB24+4 connector;

⚠Note: this connector supports LVDS signals; please do not connect the DVI cable with the DVI connector on the display directly.

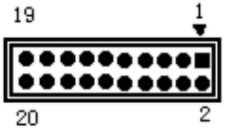


LVDS1

Pin	Signal Name	Pin	Signal Name
1	LVDS_D2-	2	LVDS_D2+
3	GND	4	BKLTEN
5	BKLTCTL	6	NC
7	NC	8	+5V
9	LVDS_D1-	10	LVDS_D1+
11	GND	12	VDD_LCD
13	VDD_LCD	14	+5V
15	GND	16	+12V
17	LVDS_D0-	18	LVDS_D0+
19	GND	20	GND
21	GND	22	GND
23	LVDS_CLK+	24	LVDS_CLK-
C1	+5V	C2	+5V
C3	+12V	C4	+12V
C5	NC		

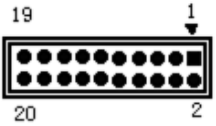
4.4.7 GPIO

GPIO1 is the digital GPIO while GPIO2 is the isolation GPIO; the pin definitions are as follows:



GPIO1

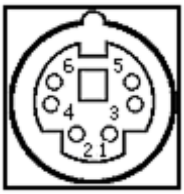
Pin	Signal Name	Pin	Signal Name
1	DI16	2	DI17
3	DI18	4	DI19
5	DI20	6	DI21
7	DI22	8	DI23
9	DI24	10	DI25
11	DI26	12	DI27
13	DI28	14	DI29
15	DI30	16	DI31
17	GND	18	GND
19	+5V	20	+12V



GPIO2

Pin	Signal Name	Pin	Signal Name
1	IDO0	2	IDO1
3	IDO2	4	IDO3
5	IDO4	6	IDO5
7	IDO6	8	IDO7
9	EO.GND	10	EO.COM
11	IDO10	12	IDO11
13	IDO12	14	IDO13
15	IDO14	16	IDO15
17	IDO16	18	IDO17
19	EI.COM1	20	EI.COM2

4.4.8 Mouse & Keyboard Connector (adopts standard 2-in-1 mouse & keyboard connector)

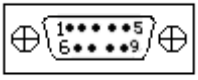


KM1

Pin	Signal Name
1	KB_DATA
2	MS_DATA
3	GND
4	+5V
5	KB_CLK
6	MS_CLK

4.4.9 Serial Port

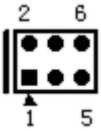
COM1 and COM2 support RS-232/RS-422/RS-485 mode selection; COM1 supports Modem wake-up function. COM3 ~ COM5 are isolation serial ports: COM3 and COM5 only support RS-232 mode, COM4 can switch among RS-232/RS-422/RS485 mode. COM6 ~ COM10 support RS-232 mode. The pin definitions are as follows:



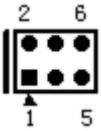
COM1/COM2
COM6 ~ COM10

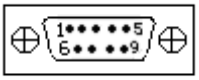
Pin	Signal Name		
	RS-232	RS-422	RS-485
1	DCD#	TXD-	Data-
2	RXD	TXD+	Data+
3	TXD	RXD+	NC
4	DTR#	RXD-	NC
5	GND	GND	GND
6	DSR#	NC	NC
7	RTS#	NC	NC
8	CTS#	NC	NC
9	RI#	NC	NC

RS-232/RS-422/RS-485 mode selection for COM1 (motherboard)

	Pin Setting	Mode Selection		
		RS-232 (Default)	RS-422	RS-485
 JP3/JP4/JP5	JP3	1-2	5-6	3-4
	JP4	1-3, 2-4	3-5, 4-6	3-5, 4-6
	JP5	1-3, 2-4	3-5, 4-6	3-5, 4-6

RS-232/RS-422/RS-485 mode selection for COM2 (motherboard)

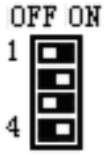
	Pin Setting	Mode Selection		
		RS-232 (Default)	RS-422	RS-485
 JP8/JP9/JP10	JP8	1-2	5-6	3-4
	JP9	1-3, 2-4	3-5, 4-6	3-5, 4-6
	JP10	1-3, 2-4	3-5, 4-6	3-5, 4-6

	Pin	Signal Name		
		RS-232	RS-422	RS-485
 COM3/COM4/COM5	1	NC	TX-	Data-
	2	RXD	TX+	Data+
	3	TXD	RX+	NC
	4	NC	RX-	NC
	5	GND	GND	GND
	6	NC	NC	NC
	7	NC	NC	NC
	8	NC	NC	NC
	9	NC	NC	NC

Note: the data transmission direction is controlled automatically under RS-485 mode.

RS-232/RS-422/RS-485 mode selection for COM port

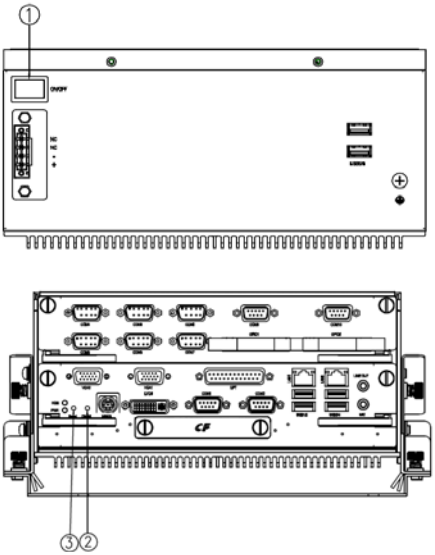
RS-232/RS-422/RS-485 mode selection for COM4 (IO board)

	Pin Setting		Mode Selection		
			RS-232 (Default)	RS-422	RS-485
 SW1 ~ SW5	SW1	1	/	ON	OFF
		2	/	OFF	ON
		3	/	ON	ON
		4	/	NC	NC
	SW2	1	/	OFF	ON
		2	/	OFF	ON
		3	/	NC	NC
		4	/	NC	NC
	SW3	1	ON	OFF	OFF
		2	OFF	ON	ON
		3	NC	NC	NC
		4	NC	NC	NC
	SW4	1	/	ON	ON
		2	/	ON	OFF
		3	/	ON	ON
		4	/	ON	OFF
	SW5	1	ON	OFF	OFF
		2	OFF	ON	ON
		3	ON	OFF	OFF
		4	OFF	ON	ON

4.5 Operation Control

⚠ Warning
Pressing On/Off button won't cut off the power of the PC!

⚠ Caution
Data loss might occur when implementing hardware reset on PC.

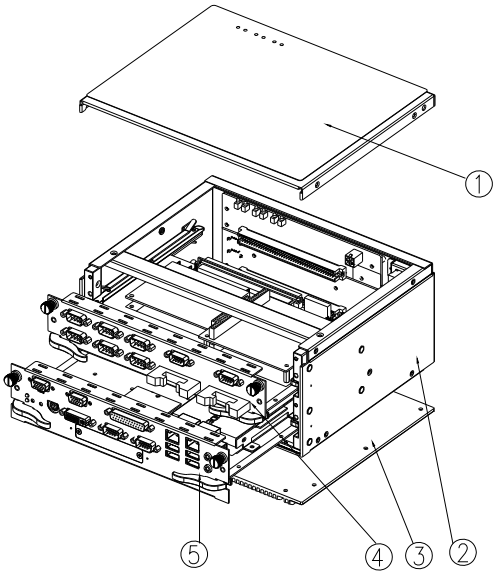
Control Button	Item	Description
	①	Power on/off button of the PC
	②	Clearing CMOS button Use a sharp-point object or clip to operate the Clearing CMOS button when the PC is powered off and disconnected from power supply. Pressing button signal will reset BIOS and restore the BIOS setting to factory default value.
	③	Reset button Use a sharp-point object or clip to operate the reset button. Pressing button signal will reset the hardware. The PC will be rebooted (cold reset).

4.6 Status Indicator

Display	Meaning	LED	Description
POWER	Indicates PC status	Off	Disconnected from power supply
		Green	PC is operating
HDD	Indicates HDD access	Off	No access
		Yellow	Accessing

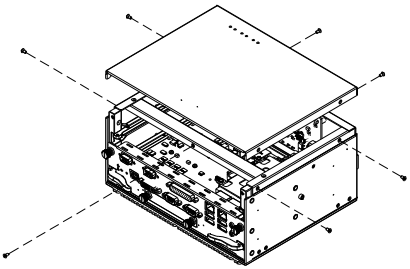
5. Assembly and Maintenance

5.1 Overall Assembly Drawing



Item	Description	Item	Description
1	Upper cover	2	Chassis
3	Bottom cover	4	Expansion board
5	Motherboard		

5.2 Installing the Cover



1、 Remove the expansion board module;

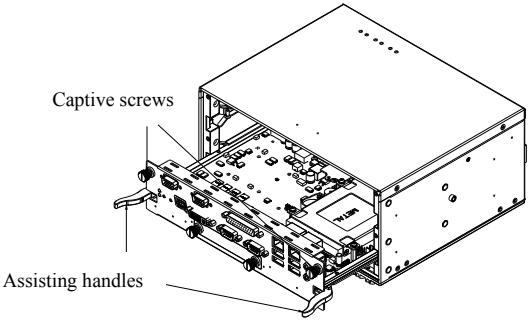
2、 Loosen the six screws fixing the cover by screwdriver, two each on both sides and on the rear;

3、 Loosen the screws fixing the cover and the cover supporting bar by screwdriver;

4、 Uplift the cover vertically.

5.3 Removal and Installation of Motherboard

5.3.1 Installing the Motherboard



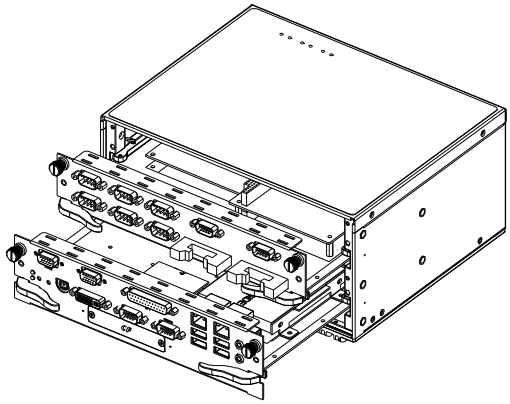
1、 Push the motherboard gently along the guide rail into the corresponding slot;

2、 When approaching the backplane connector, open the assisting handles outward with both hands; then buckle the chassis inward with force and push the board inward at the same time;

3、 When the board is properly in position, tighten the two captive screws on both sides of the motherboard panel;

4、 Install the expansion card in the same way.

5.3.2 Removing the Motherboard

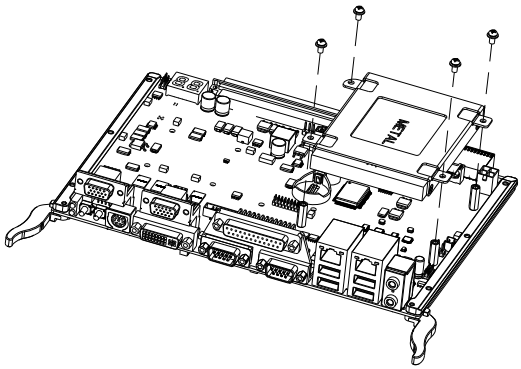


1、 Loosen the two captive screws on both sides of the motherboard panel;

2、 Horizontally open the assisting handles outward to remove the motherboard;

3、 Remove the expansion card in the same way.

5.4 Removing the Driver

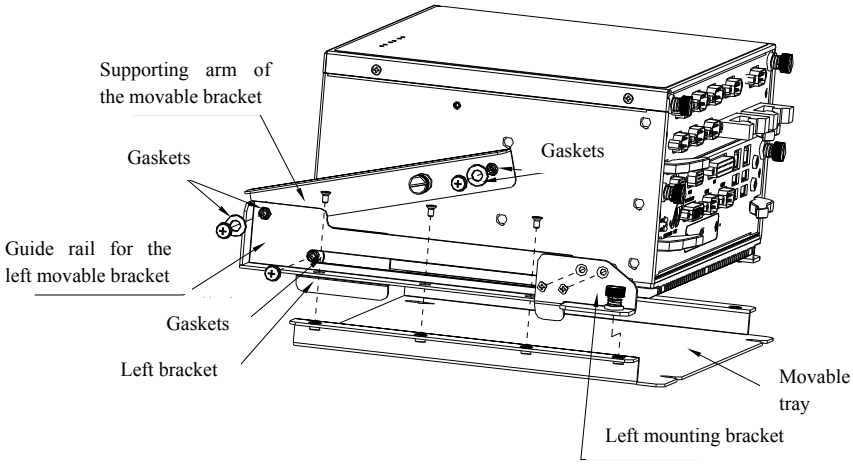


1、 The hard disk module has been installed on the motherboard, before removing the hard disk module, please draw the motherboard out of the chassis;

2、 Remove the four screws fixing the hard disk bracket as shown in the figure;

3、 Gently remove the hard disk module away from the SATA connector on motherboard to take the module out.

5.5 Installing the Wall-mounted Bar



1、 Use two countersunk head screws of the corresponding specification to fix the left mounting bracket with the chassis; refer to the figure for its position;

2、 Use two countersunk head screws of the corresponding specification to fix the left bracket with the chassis; refer to the figure for its position;

3、 Apply a gasket between the supporting arm of the movable bracket and the chassis; fix the supporting arm of the movable bracket on the chassis with corresponding truss head screws (apply a gasket, as shown in the above figure)

4、 Apply a gasket between the supporting arm of the movable bracket and the guide rail for the left movable bracket; fix the supporting arm of the movable bracket and the guide rail for the left movable bracket with corresponding truss head screws (apply a gasket), as shown in the above figure;

5、 Install the mounting bracket on the right side of the chassis, the right bracket, the guide rail for the right movable bracket and the supporting arm of the right movable bracket in the same way;

6、 Use three countersunk head screws of the corresponding specification to fix the guide rail for the left/right movable bracket with the movable tray;

7、 Fasten the captive screws on the left/right mounting bracket, so as to fix the mounting brackets with the movable bracket.

6. Installing the Drivers

Regarding the driver program of this product, please refer to the enclosed CD.

7. Appendix

7.1 Troubleshooting and Solutions

Common Malfunctions	Reasons	Troubleshooting and Solution
The device is not operating	No power supply	Please check the power supply and the power cable/connector.
	Improper device operating environment	1. Check with the environment conditions; 2. Please wait for twelve hours before powering on the device shipped in cold weather.
The external display is black	The display has not been turned on	Turn on the display
	The display is under "power saving" mode	Press any key on the keyboard.
	The luminance control is set to "Black".	Increase the screen luminance by luminance control. Please refer to the instructions of the display for detailed information.
	Power cable or display cable is not connected	1. Please check whether the power cable is correctly connected with the display, the system unit or the ground port. 2. Please check whether the display cable is correctly connected with the display and the system unit. 3. Contact Technique Support if the screen remains black after implementing the above measures.
Incorrect time or date on PC	Incorrect BIOS setting	Follow the power-on prompt and press the key to enter the BIOS Setup; adjust the time and date in BIOS Setup.

BIOS setting is correct while the time and date are incorrect.	Insufficient backup battery capacity	Replace the battery
USB device has no response	USB port is disabled in BIOS	Use other USB ports or enable that port.
	USB 2.0 device is connected; however, USB 2.0 is disabled.	Enable USB 2.0.
	USB port is not supported by the operating system.	1. Enable USB Legacy Support for the mouse and keyboard (Legacy USB is supported); 2. For other devices, appropriate USB drivers are required.
The computer is not booted or displays "Boot device not found"	In booting priority of the BIOS setting, the device is not the first priority or the device is not include in the booting device.	Modify the booting priority of the device in the Boot menu of BIOS setting or include that device into the booting priority.
No system disk can be found when powering on	The HDD power cable or data cable is not connected well	Check whether the power cable and the data cable of the hard disk (the hard disk shall be installed with operating system and is bootable) are well connected.
	System files on the hard disk are damaged	Enter the system (usually WinPE system) with a bootable disk; check whether the system in the hard disk is damaged. Reinstall the system if necessary.
Plug and play I/O card, no IO card is detected or no IO card can be used when used again	Poor contact of the slot	Poor contact is usually caused by frequent installation/ uninstallation of the PCI or ISA card, unstable fixing or improper dust-proof measures; please remove and install the card for a few times or use another slot.